

09/980440

Attorney Docket No. OUTO 2366

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## CHAPTER II

TRANSMITTAL LETTER TO THE UNITED STATES ELECTED  
OFFICE (EO/US)

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/FI00/00482

INTERNATIONAL APPLICATION NO.

30 May 2000 (30.05.00)

INTERNATIONAL FILING DATE

17 June 1999 (17.06.99)

PRIORITY DATE CLAIMED

ARRANGEMENT FOR TREATING SOLIDS SETTLED ON THE BOTTOM OF AN  
ELECTROLYTIC TANK

TITLE OF INVENTION

Tuomo KIVISTÖ (Jorvas, Finland)

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Jari STENROOS (Noormarkku, Finland)

APPLICANT(S)

Box PCT

U.S. PATENT AND TRADEMARK OFFICE

P.O. Box 2327

Arlington, Virginia 22202

Attention: EO/US

1. This national phase application claims priority of the following national application(s):

Finnish Patent Application No. 991394 filed June 17, 1999.

2. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 USC 371:

- A. ☒ This express request to immediately begin national examination procedures (35 USC 371(f)).
- B. ☒ The U.S. National Fee (35 USC 371(c)(1) and other fees (37 CFR 1.492) indicated in the attached fee calculation sheet.

3. ☒ A copy of the International application as filed [35 USC 371(c)(2)]:

- a. ☐ is transmitted herewith.

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- b. ☐ is not required as the application was filed with the United States Receiving Office.
- c. ☒ has been transmitted
- i. ☒ by the International Bureau. Date of mailing of the application (from form PCT/IB/308): 28 December 2000 (28.12.00).
- ii. ☐ by applicant on (date) \_\_\_\_\_.
4. ☒ A translation of the International application into the English language [35 USC 371(c)(2)]:
- a. ☐ is transmitted herewith.
- b. ☒ is not required as the application was filed in English.
- c. ☐ was previously transmitted by applicant on (date) \_\_\_\_\_.
- d. ☐ will follow (within 32 months of earliest priority date).
5. ☒ Amendments to the claims of the International application under PCT Article 19 [35 USC 371(c)(3)]:
- a. ☐ are transmitted herewith.
- b. ☐ have been transmitted
- i. ☐ by the International Bureau. Date of mailing of the amendment (from form PCT/IB/308): \_\_\_\_\_.
- ii. ☐ by applicant on (date) \_\_\_\_\_.
- c. ☒ have not been transmitted as
- i. ☒ applicant chose not to make amendments under PCT Article 19. Date of mailing of Search Report (from form PCT/ISA/210): 02 October 2000 (02.10.00).
- ii. ☐ the time limit for the submission of amendments has not yet expired. The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.
6. ☒ A translation of the amendments to the claims under PCT Article 19 [35 USC 371(c)(3)]:
- a. ☐ is transmitted herewith.
- b. ☐ is not required as the amendments were made in the English language.
- c. ☒ has not been transmitted for reasons indicated at point 5c above.

7. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409)
  - a. ☒ is transmitted herewith.
  - b. ☐ is not required as the application was filed with the United States Receiving Office.
8. ☒ Annex(es) to the International Preliminary Examination Report
  - a. ☐ is/are transmitted herewith.
  - b. ☐ is/are not required as the application was filed with the United States Receiving Office.
  - c. ☒ is/are not being transmitted as there is/are no Annex(es).
9. ☒ A translation of the annexes to the International Preliminary Examination Report
  - a. ☐ is transmitted herewith.
  - b. ☐ is not required as the annexes are in the English language.
  - c. ☒ is not being transmitted for the reason indicated at point 8c above.
10. ☒ An oath or declaration of the inventor [35 USC 371(c)(4)] complying with 35 USC 115
  - a. ☐ was previously submitted by applicant on (date) \_\_\_\_\_.
  - b. ☐ is submitted herewith and such oath or declaration
    - i. ☐ is attached to the application
    - ii. ☐ identifies the application and any amendments under PCT Article 19 which were transmitted as stated in points 5a or b; and states that they were reviewed by the inventor as required by 37 CFR 1.70.
  - c. ☒ will be provided in response to a Notice to File Missing Requirements.
11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
  - a. ☐ is transmitted herewith.
  - b. ☒ has been transmitted by the International Bureau. Date of mailing (from form PCT/IB/308): 28 December 2000 (28.12.00).
  - c. ☐ is not required as the application was searched by the United States International Searching Authority.
  - d. ☐ will be transmitted promptly upon request.

e. ☐ has been submitted by applicant on (date) \_\_\_\_\_.

12. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98:

a. ☐ is transmitted herewith.

Also transmitted herewith is

☐ Form PTO-1449

☐ Copies of citations listed

b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 USC 371(c).

c. ☐ was previously submitted by applicant on (date) \_\_\_\_\_.

13. ☐ The applicant claims small entity status with respect to this application.

☐ A Verified Statement Claiming Small Entity Status is attached.

☐ The undersigned claims small entity status on behalf of the applicant.

14. ☐ An assignment document is transmitted herewith for recording. A separate ☐ "RECORDATION COVER SHEET" is also attached.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

15. ☒ Additional documents

a. ☐ Copy of request (PCT/RO/101)

b. ☒ International Publication No. WO 00/79026

i. ☐ Specification, claims and drawing

ii. ☒ Front page only

c. ☒ Preliminary amendment

d. ☒ Abstract

e. ☐ Other

\_\_\_\_\_

16. ☒ The above checked items are being transmitted

a. ☒ before 30 months from any claimed priority date.

b. ☐ after 30 months but before 32 months (surcharge and/or processing fee included) from any claimed priority date.

17. ☐ Certain requirements under 35 USC 371 were previously submitted by the applicant on \_\_\_\_\_, namely:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
John Smith-Hill  
Reg. No. 27,730

SMITH-HILL & BEDELL, P.C.  
12670 N.W. Barnes Road, Suite 104  
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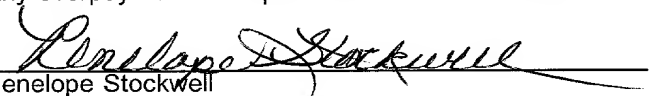
(503) 574-3100

FEE CALCULATION SHEET  
Entry into National Phase of PCT/FI00/00482

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
* [x]	TOTAL CLAIMS 10	-20 =	0	x \$ 18 =	\$ 0
	INDEPENDENT CLAIMS 1	- 3 =	0	x \$ 84 =	\$ 0
	MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280 =	\$ 0
BASIC FEE	[ ] U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO:  [ ] and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(1) to (4) have been satisfied for all the claims presented in the application entering the national state (37 CFR 1.492(a)(4)) \$100  [ ] and the above requirements are not met (37 CFR 1.492(a)(1)) \$710  [x] U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO:  [ ] has been paid (37 CFR 1.492(a)(2)) \$740  [x] has not been paid (37 CFR 1.492(a)(3)) \$1,040  [ ] where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR 1.492(a)(5)) \$890				1,040
OTHER FEES	Surcharge of \$130 for furnishing the oath or declaration later than 30 months (but not later than 32 months) from any claimed priority date (37 CFR 1.492(e) and 37 CFR 1.495(c)).				+ 130
	Total of above Calculations				= 1,170
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Affidavit must be filed also. (note 37 CFR 1.9, 1.27, 1.28)				-
	Subtotal				1,170
	Processing fee of \$130 for furnishing the English Translation later than 30 months (but not later than 32 months) from any claimed priority date (37 CFR 1.492(f) and 37 CFR 1.495(c)).				+
	Total National Fee				\$ 1,170
	Fee for recording the enclosed assignment document \$40 (37 CFR 1.21(h)).				+
TOTAL	TOTAL FEES ENCLOSED				\$ 1,170

\* See attached Preliminary Amendment.

[x] A check in the amount of \$1,170 to cover the above fees is enclosed.

[x] Please charge any additional basic filing fees under 37 CFR 1.492(a) which may be required by this paper, or credit any overpayment to Deposit Account No. 19-2560.  
This sheet is filed in duplicate.  
Penelope Stockwell

PATENT

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Tuomo KIVISTÖ et al

Art Unit:

Application No:

Examiner:

Filed:

For: ARRANGEMENT FOR TREATING SOLIDS  
SETTLED ON THE BOTTOM OF AN  
ELECTROLYTIC TANK

PRELIMINARY AMENDMENT

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Please make the following amendments to this application prior  
to examination thereof.

AMENDMENTSIn the Claims:

Claims 3-10, cancel.

Add new claims as follows:

11. (New) An arrangement according to claim 1, characterized in that in connection with the collector element, there is provided a lid element, so that the collector element and/or the lid element are movable at least with respect to each other.

12. (New) An arrangement according to claim 1, characterized in that the collector element is installed turnably in a drive arrangement.

13. (New) An arrangement according to claim 1, characterized in that the arrangement comprises means for directing at least one intermediate agent jet towards the solids in the collecting direction, prior to the collector element.

14. (New) An arrangement according to claim 1, characterized in that the arrangement comprises at least one suction element placed advantageously after the collector element with respect to the collecting direction.

15. (New) An arrangement according to claim 1, characterized in that the means for directing the intermediate agent jet to the solids comprise at least one nozzle, which is directed to the sieve element of the collector element.

16. (New) An arrangement according to claim 1, characterized in that the collector element is at least partly made of a plate provided with apertures.

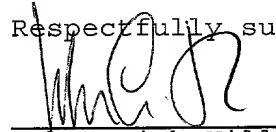
17. (New) An arrangement according to claim 8, characterized in that the sieve element of the collector element is composed of bar elements that are spaced apart.

18. (New) An arrangement according to claim 1, characterized in that the drive apparatus of the collector element is a separating wall.

REMARKS

The above amendments are presented in order to place this application in better condition for examination.

Respectfully submitted,

  
\_\_\_\_\_  
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Docket: OUTO 2366



NOV 2001

## ARRANGEMENT FOR TREATING SOLIDS SETTLED ON THE BOTTOM OF AN ELECTROLYTIC TANK

The present invention relates to an arrangement for treating solids settled on  
5 the bottom of an electrolytic tank.

In electrolytic processes, metals such as copper, nickel and zinc, are precipitated on the surfaces of cathodes located in the electrolytic tank, starting either with metal anodes that are dissolved into the electrolyte present in the  
10 electrolytic tank, or with metal ions that are already dissolved into the electrolyte. However, all solids are not precipitated onto the cathode surfaces, for example precious metals and solid impurities present in the electrolyte. Therefore on the bottom of electrolytic tanks, there are accumulated, along with the metal refining process, various solids that must from time to time be  
15 removed from the tank, for instance because said solids contain valuable ingredients, such as precious metals, or because a thicker solids accretion threatens the purity of the cathode obtained from the electrolytic process.

Usually the solids accumulated in the electrolytic tank are at least partly very  
20 finely divided and only somewhat heavier than the electrolyte, wherefore it is difficult to separate the solids from the electrolyte. During the electrolytic process, the circulation of the solids from off the bottom of the electrolytic tank is very harmful, because in that case there is a particularly high risk that the solids proceed onto the cathode, and this would essentially weaken the purity  
25 of the metal to be produced.

The removal of the solids accumulated on the bottom of an electrolytic tank usually requires that the whole electrolytic process must be interrupted, which reduces the efficiency per time, i.e. the productivity of the electrolytic plant.  
30 Hence the removal of solids must be arranged so that it forms part of the process of replacing the electrodes, i.e. anodes and cathodes; this, however makes the replacement process complicated and slow, and also restricts the

removal of solids to take place in the rhythm dictated by the process of replacement. Moreover, a remarkable amount of the electrolyte must be first removed from the tank and then fed back therein, which generally leads to harmful effects in the electrolyte quality and causes a lot of extra work. Into the solids treatment system, there also flows a remarkable amount of electrolyte, which must be replaced with new and may be harmful in the further treatment of the solids. Moreover, the manual washing of the electrolytic tanks makes the process clearly more labor-intensive and subjects the employees to various health hazards, among others owing to the effects of the ingredients contained in the splashes and spray emanating from the tank. In addition, owing to the personnel required by the washing of the tanks, the automatization of the electrode treatment is often nearly impossible, which further increases the labor demand in an electrolytic plant.

From the international patent application WO 99/11841, there is known a separating element for separating the bottom part of an electrolytic tank from the rest of the tank space in connection with the removal of the solids settled on the tank bottom. In said publication, in the electrolytic tank there are arranged support and control members that form the trajectory of the separating element, so that the separating element can be placed in the electrolytic tank and removed therefrom through a space provided in between at least one end wall and the electrode placed nearest to said end wall. In the arrangement according to said publication, the separating element is provided with nozzles attached thereto, and through said nozzles, liquid or gas is conducted to the bottom part of the electrolytic tank in order to help remove the solids. The solids and liquid are removed for instance through a discharge aperture provided in the electrolytic tank bottom. However, the solids may contain particles that are coarser than the rest of the material and are not discharged in the manner described above. Owing to their larger size, they also may cause blockages in the outlet channels. Typically the particles with a larger grain size are separated from the finer slurry after the tank cleaning step.

The object of the invention is to realize a completely new type of arrangement to be used for treating the solids settled on the bottom of an electrolytic tank. The invention is characterized by the novel features set forth in the appended  
5 claims.

The arrangement according to the invention is characterized in that it comprises a collector element which is moved essentially along the electrolytic tank bottom or in the vicinity thereof, said collector element  
10 comprising means for separating coarse particles from the rest of the solids. By means of the arrangement according to the invention, coarse particles can be separated from the rest of the solids already in the electrolytic tank, preferably without having to first drain the electrolyte from the tank. The arrangement can also be used in connection with the cleaning of an already emptied tank.

15

A preferred embodiment of the arrangement according to the invention is characterized in that the means for separating coarse particles consist of a sieve element. By installing the sieve element in the collector element, there is obtained an advantageous and effective structure for separating and collecting  
20 coarse particles.

Another preferred embodiment of the invention is characterized in that in connection with the collector element, there is arranged a lid element, so that the collector element and/or the lid element are movable at least with respect  
25 to each other. By providing the collector element with a movable lid arrangement, it can be ensured that the separated coarse particles cannot move from the collector element back to the tank, when the collector element is being removed from the tank.

30 Another preferred embodiment of the invention is characterized in that the arrangement comprises means for directing a jet of some intermediate agent to the solids in the collecting direction prior to the collector element. By means of

intermediate agent jets, the detaching of the solids from off the tank bottom can be boosted, and their transfer to the collector element as well as the separation of solids by the sieve element and the passage of the finer particles through the sieve can be intensified.

5

By providing the arrangement according to the invention preferably with at least one suction element arranged in succession to the collector element in the collecting direction, at least an essential part of the finer solids particles that penetrated the sieve element of the collector element are effectively  
10 removed from the tank.

The invention is explained in more detail with reference to the appended drawings, where

figure 1 shows a preferred embodiment of the invention in an electrolytic tank,  
15 seen in a side-view illustration in partial cross-section,

figure 2 illustrates the embodiment of figure 1, seen in the direction A - A,

figure 3 illustrates an embodiment of the arrangement according to the invention, seen in a partial side-view cross-section,

figure 4 illustrates an embodiment according to the invention, seen in the  
20 direction B - B of figure 3, and

figure 5 illustrates another embodiment according to the invention, seen in the direction B - B of figure. 3.

Figures 1 and 2 represent a general illustration of an electrolytic tank 1, where  
25 there are in turns placed electrodes, anodes 2 and cathodes 3, and the metal to be produced in the electrolytic process is precipitated onto the cathode by means of an electrolytic solution 4 present in the electrolytic tank. During the electrolytic process, on the bottom 5 of the electrolytic tank 1 there are settled solids 6 that should be removed from the electrolytic tank from time to time.

30

The arrangement for treating the solids settled on the electrolytic tank bottom comprises a collector element 11, which is movable essentially along the

bottom 5 of the electrolytic tank 1 or in the vicinity thereof, said collector element 11 comprising means for separating coarse particles from the rest of the solids. Said collector element 11 is typically formed to be for instance ladle-like in shape, so that in the collecting position, the front edge 11a of the collector element is arranged against the tank bottom 5, in which case, when moving the collector element, the solids 6 settled on the tank bottom are transferred to the collector element, onto the means provided therein for separating coarse particles from the rest of the solids. In a typical example, the size of the coarse particles is of the order 2 - 60 mm.

10

The means provided in the collector element for separating coarse particles typically consist of a sieve element 12. As for the sieve element, it is typically formed on the inner surface of the collector element, in which case the coarser particles are left in the collector element, whereas the finer particles pass through the sieve elements arranged in the collector element. According to a preferred embodiment (figure 4), the collector element is at least partly made of a plate provided with apertures 13, and the size of said apertures 13 is matched according to the desired separating capacity. The size and shape of the apertures 13 provided in the sieve element depend on the properties of the solids under treatment.

20

According to another preferred embodiment (figure 5), the sieve element of the collector element 11 is composed of bar elements 14 that are spaced apart. The mutual distance between the adjacent bar elements is matched according to the desired separating capacity. Thus at least one wall of the collector element 11 is made rake-like, so that the bar elements 14 represent the peaks in said rake element. In the case according to the drawing, the bar elements 14 are bent double, at least at the end that is in contact with the tank bottom 5, preferably essentially in an U-shape.

30

In a preferred embodiment according to the invention, in connection with the collector element 11, there is arranged a lid element 15, so that the collector

element 11 and/or the lid element 15 are movable at least with respect to each other. According to a preferred embodiment, the collector element 11 is arranged turnably in a drive apparatus 10. The collector element is arranged to turn from the collecting position to the top position 11' (illustrated by dotted lines in figure 3), in which top position the lid element 15 prevents the coarse particles that are left in the collector element 11 from flowing out of the collector element for instance when the collector element is being removed from the tank 1. In the embodiment of figure 3, the lid element 15 is arranged in the separating wall 10, serving as the drive apparatus, movably at the edge thereof. Between the lid element 15 and the collector element 11, there is arranged transmission, for example wire transmission. The lid element 15 is installed in the separating wall 10, at the front edge and movably in the motional direction thereof, so that when the lid element 15 touches the (end) wall of the tank, the lid element 15 is stopped, while the fastening point of the collector element 11 still proceeds somewhat towards the wall. Now the wire transmission turns the collector element from the collecting position to the top position 11', where the collector element is advantageously locked. Thereafter the collector element 11 can be removed from the tank 1, for example by moving it by the drive apparatus 10 to the direction opposite to the collecting direction.

The collector element 11 is attached, by intermediation of a fastening element 16, to the drive apparatus 10. In the fastening element, there is provided a transversal axis element 17, around which the collector element is turnably arranged. The lid element 15 is installed, by intermediation of at least one support member 18, so that it is movable back and forth in the collecting direction. In the embodiment according to figure 3, the motion of the lid element 15 is transmitted by transmission means 19, 20, particularly wire transmission means, to a rotary motion of the collector element 11 around the axis 17. Around the axis 17, there is provided a sleeve element 19 to which the collector element 11 is attached. Around the sleeve element 19, there is wound a cable wire 20, which is fastened, at least in one point, to the sleeve element

19. The first end of the wire 20 is attached to the lid element, to a first fastening point 21, and the other end of the wire is attached to the lid element, to a second fastening point 22. The first fastening point 21 and the second fastening point 22 of the wire are located, in the motional direction of the lid  
5 element 15, on opposite sides of the turning axis 17 of the collector element. This is only one alternative for turning the collector element 11 against the lid element 15. For a man skilled in the art, it is obvious that other turning arrangements can be used in connection with the collector element.

10 The collecting and separating effects of the arrangement according to the invention can be intensified, when the arrangement comprises means 23, 24 for directing a jet 25 of some intermediate agent to the solids 6 in the collecting direction, prior to the collector element 11. The intermediate agent jets push the solids 6, particularly the finer solids, towards the collector element 11, and  
15 further through the sieve element 12, 14.

The arrangement may comprise suction elements 26 that are advantageously positioned in the collecting direction after the collector element, in order to remove from the tank at least part of the finer solid particles that have passed  
20 the sieve of the collector element 11. Thus the bottom 5 of the electrolytic tank is cleared of solids 6, and simultaneously the solids are classified according to particle size. The separating capacity can be boosted further, when the means for directing an intermediate agent jet to the solids comprise at least one nozzle 23, which is directed towards the sieve element 12, 14 of the collector  
25 element. The nozzles 23, 24 can be arranged for example in the lid element 15, which in the collecting position extends to a distance from the collector element 11 in the collecting direction.

In the embodiment according to figures 1 and 2, the arrangement according to  
30 the invention is attached to the separating wall 10, which at the same time serves as the drive apparatus of the collector element. In connection with the electrolytic tank, preferably in the side walls 7, 8 of the tank, there are provided

support and control members 9. By means of the support and control members 9, the separating element serving as the drive apparatus is supported, while the separating element is placed in the electrolytic tank 1, and controlled while it is being immersed in the electrolytic tank, in which case the created trajectory 5 is mainly defined by the support and control members. Typically the employed support and control members 9 are grooves provided in the opposite walls 7, 8 of the tank, wherein the side edges of the separating element 10 are matched to fit. One embodiment of said separating wall is described in the publication WO 99/11841.

10

The arrangement according to the invention is operated for instance as follows. The arrangement is transferred onto the bottom of an electrolytic tank, for example at one end of the tank, between the tank wall and the electrode that is located nearest to said wall. The collector element is moved along the bottom, 15 so that the solids settled on the bottom are treated with the collector element. The finer solid particles pass the sieve provided in the collector element, whereas the coarser particles remain in the collector element. The finer particles that passed the sieve of the collector element 11 are conducted, along a conduit 27, out of the tank; they are collected in said conduit 27 by 20 means of at least one suction element 26 that is located in succession to the collector element 11 in the collecting direction. The collecting and/or separating effect can be further intensified by directing jets 25 of some intermediate agent to the material 6 under treatment, in the collecting direction prior to the collector element and/or to the sieve of the collector element 11. When the 25 collector element 11 has reached the opposite end of the tank, the collector element rises to the top position 11', where the front edge 11a of the collector element is placed essentially against the lid element 15. The coarser particles collected in the collector element 11 remain in the collector element 11 while it is moved to the opposite direction, out of the tank. Typically the collector 30 element is first stopped at a short distance from the final position, and underneath it there is placed a vessel for receiving the coarser particles. Then the collector element is transferred to the unloading position, where it is



opened and the coarser particles are shifted from the collector element to the reception vessel. During said treatment, the electrolyte can typically be immersed in the tank.

- 5 For a man skilled in the art, it is obvious that the invention is not restricted to the above described embodiments only, but it can be modified within the scope of the appended claims.

## CLAIMS

1. An arrangement for treating solids settled on the bottom of an electrolytic tank, **characterized** in that said arrangement comprises a collector element  
5 (11) movable essentially along the bottom (5) of the electrolytic tank (1) or in the vicinity thereof, said collector element (11) being provided with means (12, 14) for separating coarse particles from the rest of the solids.
2. An arrangement according to claim 1, **characterized** in that the means for  
10 separating coarse particles constitute a sieve element (12).
3. An arrangement according to claim 1 or 2, **characterized** in that in connection with the collector element (11), there is provided a lid element (15), so that the collector element (11) and/or the lid element (15) are movable at  
15 least with respect to each other.
4. An arrangement according to any of the preceding claims 1 - 3, **characterized** in that the collector element (11) is installed turnably in a drive arrangement (10).  
20
5. An arrangement according to any of the preceding claims 1 - 4, **characterized** in that the arrangement comprises means (23, 24) for directing at least one intermediate agent jet (25) towards the solids in the collecting direction, prior to the collector element (11).  
25
6. An arrangement according to any of the preceding claims 1 - 5, **characterized** in that the arrangement comprises at least one suction element (26) placed advantageously after the collector element (11) with respect to the collecting direction.  
30
7. An arrangement according to any of the preceding claims 1 - 6, **characterized** in that the means (23, 24) for directing the intermediate agent

jet to the solids comprise at least one nozzle (23), which is directed to the sieve element (12, 14) of the collector element.

8. An arrangement according to any of the preceding claims 1 - 7,  
5 **characterized** in that the collector element (11) is at least partly made of a plate provided with apertures.

9. An arrangement according to any of the preceding claims 1 - 8,  
**characterized** in that the sieve element of the collector element (11) is  
10 composed of bar elements (14) that are spaced apart.

10. An arrangement according to any of the preceding claims 1 - 9,  
**characterized** in that the drive apparatus of the collector element (11) is a  
separating wall (10).  
15

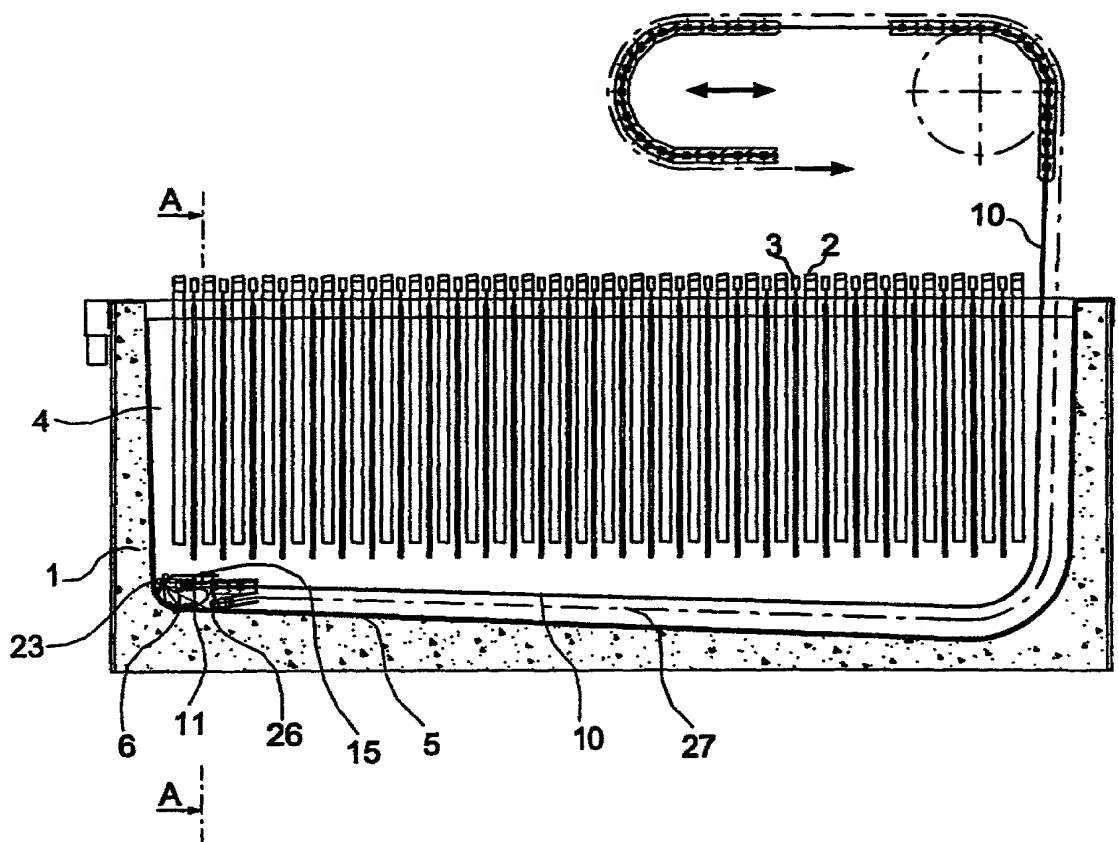


Fig. 1

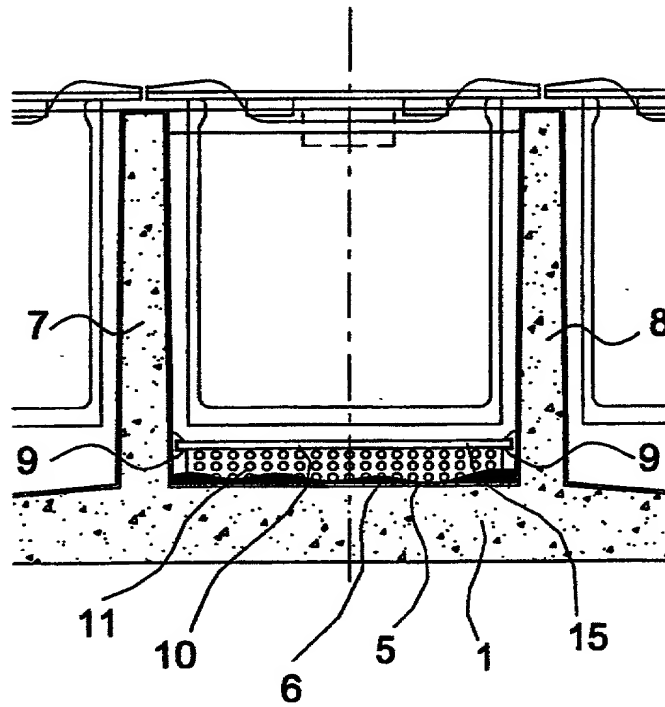


Fig. 2

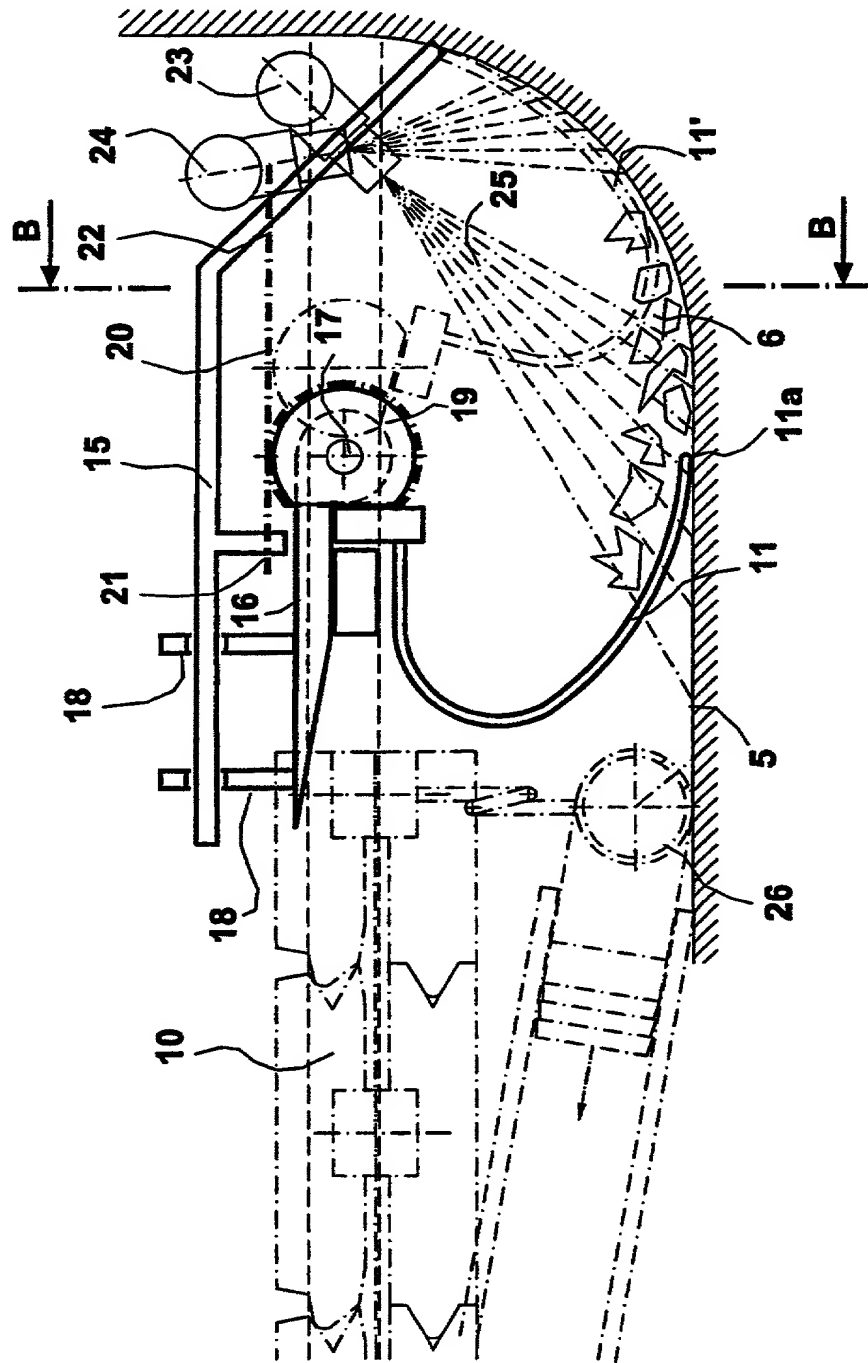


Fig. 3

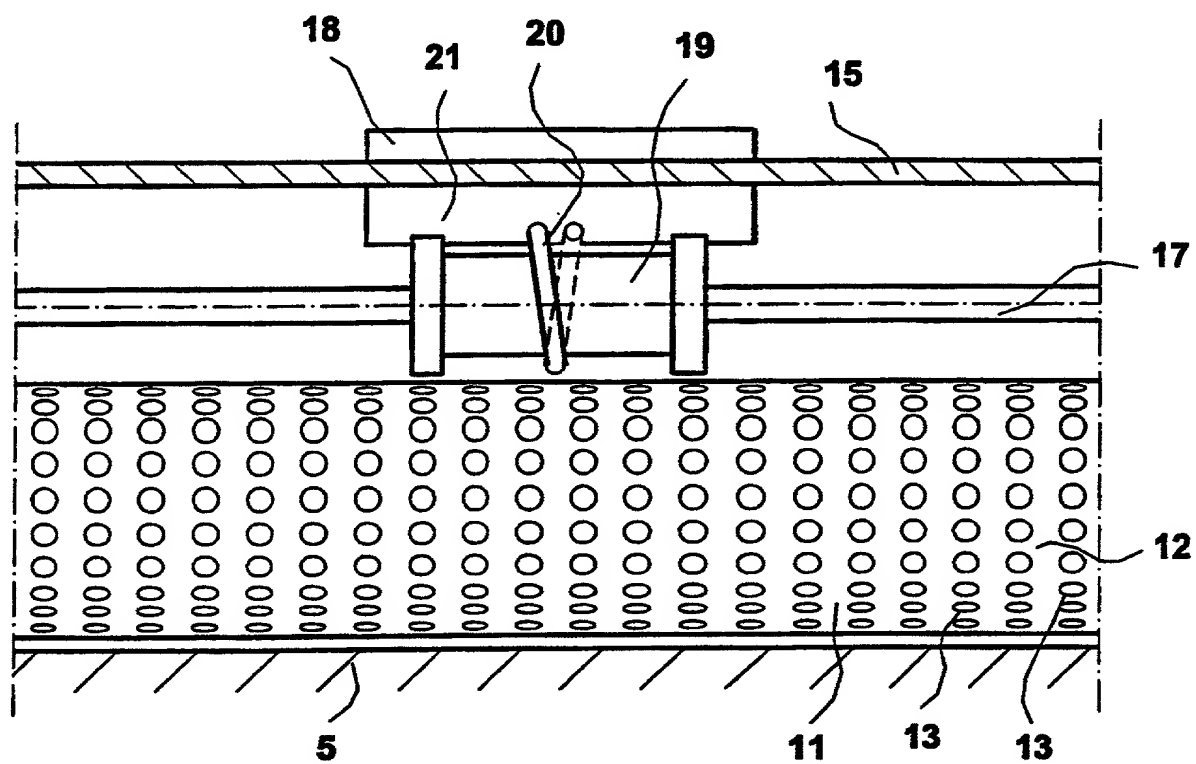


Fig. 4

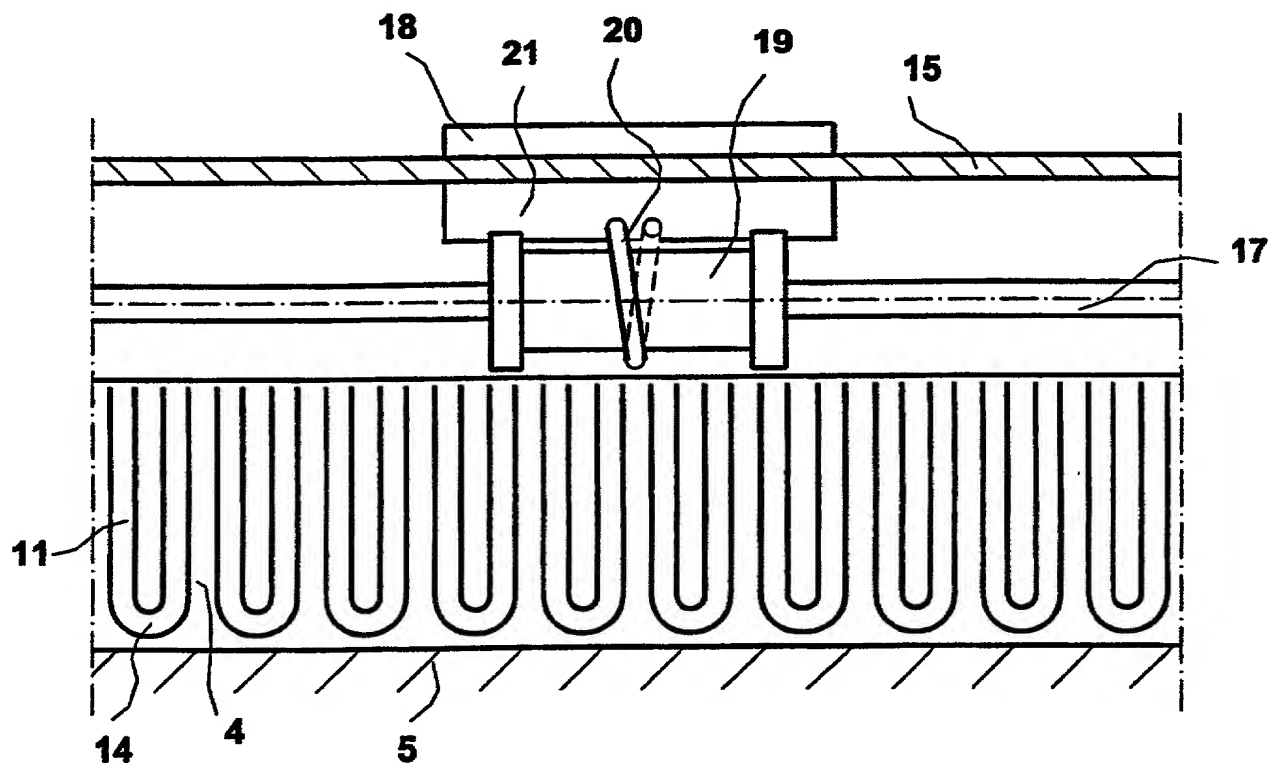


Fig. 5

DECLARATION FOR PATENT APPLICATION  
(COMBINED WITH POWER OF ATTORNEY)  
(ORIGINAL APPLICATION)

COPY

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name. I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Arrangement for treating solids settled on the bottom of

an electrolytic tank

the specification of which is attached hereto unless box (a) or (b) is checked, in which case

(a) ☐ the specification was filed on \_\_\_\_\_ as Application No. \_\_\_\_\_.

(b) ☒ the specification was filed as PCT International Application No. PCT/FI00/00482 filed on 30 May 2000 and was amended under PCT Art. 19 on \_\_\_\_\_ (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Sec. 1.56.

I have identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America and filed less than 12 months (6 months for designs) prior to this United States application and of which I claim foreign priority benefits under Title 35, United States Code, Sec. 119, and I have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

EARLIEST FOREIGN APPLICATION, AND ALL FOREIGN  
APPLICATIONS FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN)  
PRIOR TO THIS U.S. APPLICATION

<u>Country</u>	<u>Application No.</u>	<u>Date of Filing</u> (month/day/year)
Finland	991394	17 June 1999
_____	_____	_____



As a named inventor, I hereby appoint the practitioners associated with **Customer Number 007812** (John Smith-Hill, Reg. No. 27,730 and Daniel J. Bedell, Reg. No. 30,156) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent.

Send correspondence to the correspondence address associated with **Customer Number 007812**.

I hereby authorize the practitioners that I have appointed to accept instructions regarding this application and the resulting patent from OUTOKUMPU OYJ.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Title 18, United States Code, Sec. 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's signature \_\_\_\_\_

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Full name of fifth joint inventor, if any \_\_\_\_\_

Inventor's signature \_\_\_\_\_

Date \_\_\_\_\_ Country of Citizenship \_\_\_\_\_

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Full name of sixth joint inventor, if any \_\_\_\_\_

Inventor's signature \_\_\_\_\_

Date \_\_\_\_\_ Country of Citizenship \_\_\_\_\_

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Full name of seventh joint inventor, if any \_\_\_\_\_

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